

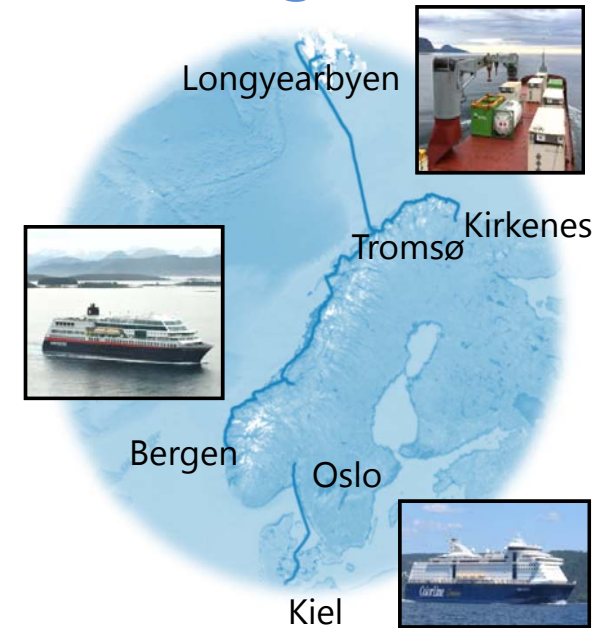
Monitoring Ocean Acidification using FerryBox

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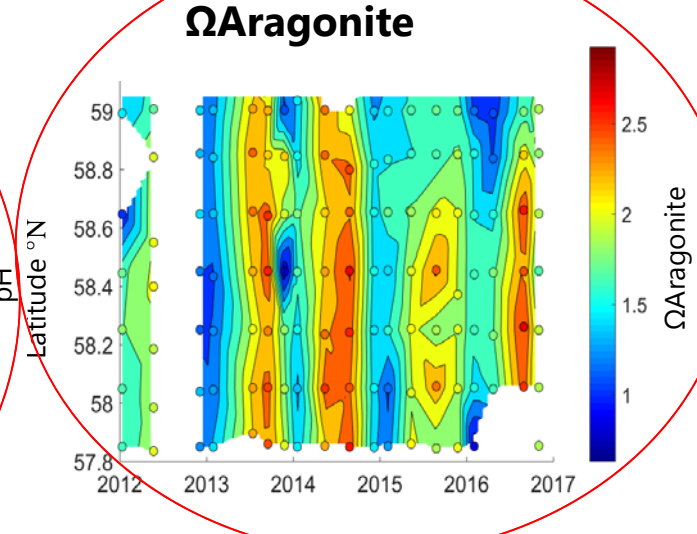
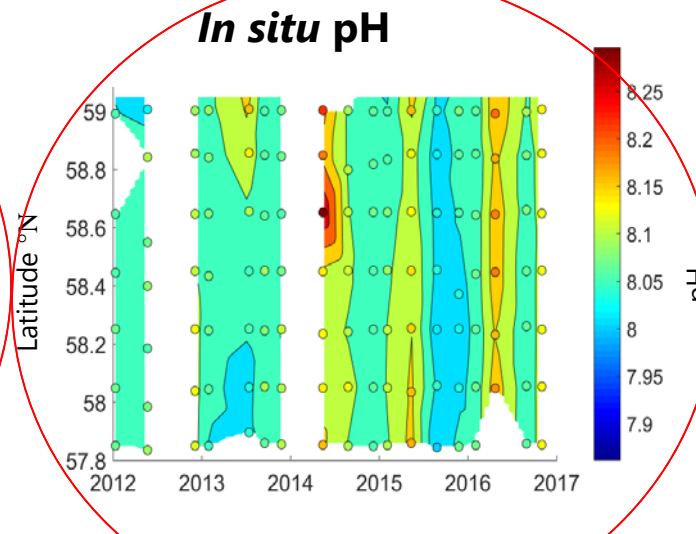
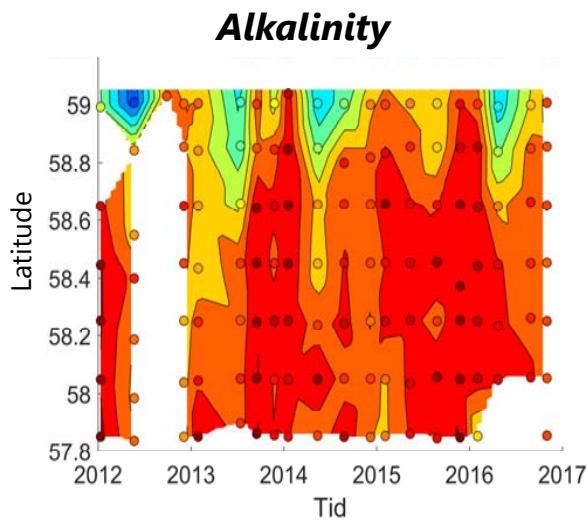
Project: The Ocean Acidification Monitoring

- **National project for the Norwegian Environment Agency (2010-2020)**
 - Partners IMR (lead), NIVA and UNI Research
- Monitor OA: the excess of protons accumulating over time because of anthropogenic emissions of CO₂
- **FerryBox is used** to cover seasonal surface water carbonate chemistry in
 - The Barents Sea Opening, on the transect between Tromsø and Longyearbyen (MS Norbjørn)
 - Skagerrak, on the transect between Oslo and Kiel
 - West Coast, between Bergen and Kirkenes (MS Hurtigruten Trollfjord)
- During the 7 first years → manual labor-intensive water sampling and labwork onboard
- Now combining these measurements with sensor-based continuous measurements



Results: Salinity, alkalinity, pH and Ω Ar between Oslo and Kiel from 2012-2017

Strong seasonal pattern and spatial variation



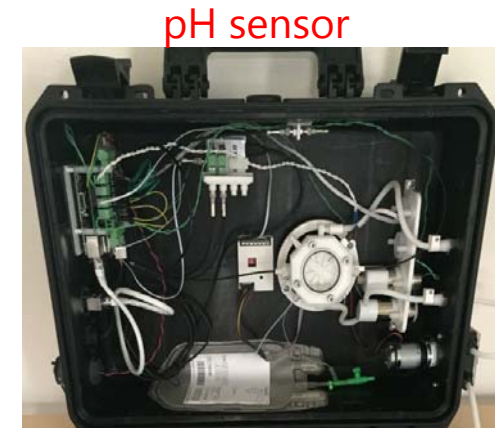
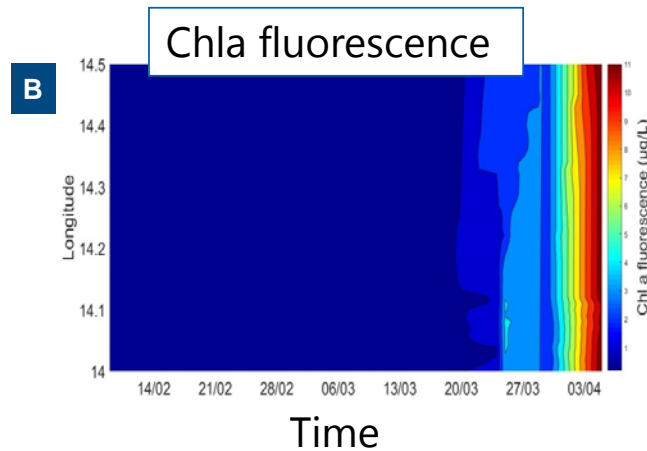
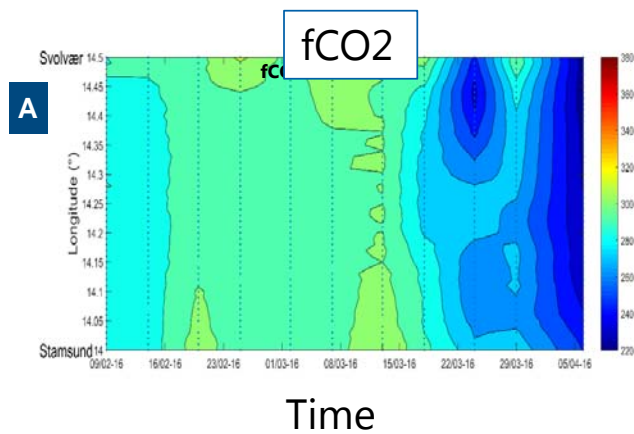
- Salinity in/near Oslofjord is lower during summer because of increased freshwater input
- This lowers alkalinity.

- pH higher during summer because of increased primary production (CO_2 is used in photosynthesis)

- Saturation state of CaCO_3 minerals**
- Important for knowing if there is a state where shells or skeletons can potentially be dissolving
 - Lower in wintertime and observed <1 near/in the Oslofjord several times

Sensor based Ocean Acidification Monitoring

- Now combining water samples with sensor-based continuous measurements
- pCO₂ and pH sensors on all ships



Our goal is to have a fully automated monitoring of Ocean Acidification in near future

Thank you!
And don't forget
to take a look at
our poster!

Acknowledgements to

- Project partner → IMR/ Melissa Chierici
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- NIVA engineer/Ingar Becsan
- Sensor development → Franatech/Michel Masson

